PENDING CLAIMS

23. The method according to claim 44, wherein said detectable label comprises a fluorophore.

24. The method according to claim 44, wherein said detectable label comprises biotin.

25. The method according to claim 44, wherein said detectable label comprises imine-biotin.

26. The method according to claim 42, wherein said dNTP comprises a functional group for addition of a fluorophore.

29. The method according to claim 42, wherein said substrate is a fiber optic bundle.

30. The method according to claim 42, wherein said substrate is selected from the group consisting of glass and plastic.

31. The method according to claim 44, wherein said detectable label is a fluorophore.

42. A method of determining the identification of a nucleotide at a detection position in a target sequence comprising:

a) providing a hybridization complex comprising

i) a first target sequence comprising

1) a first nucleotide at a detection position; and

2) a first target domain directly 5' adjacent to said detection position;

3) a second target domain 3' adjacent to said detection position;

ii) a first ligation probe hybridized to said first target domain;

iii) a second ligation probe hybridized to said second target domain;

b) contacting said hybridization complex with:

i) an extension enzyme;

ii) at least one dNTP;

such that if the base of said dNTP is perfectly complementary to the base of said detection position, said first ligation probe is extended to form a ligation structure;

c) contacting said ligation structure with a ligase to ligate said first extended ligation probe and said second ligation probe to form a ligation product; and

d) detecting the presence of said ligation product to identify the nucleotide at said detection position, said detecting comprising providing a substrate with a surface comprising discrete sites, further comprising a population of microspheres comprising at least a first and a second subpopulation, wherein each subpopulation comprises a capture probe, wherein said capture probe hybridizes to a sequence contained within said ligation product.

43. The method according to claim 42 wherein one of said ligation probe comprises an adapter sequence that hybridizes to said capture probe.

44. The method according to claim 42 wherein said dNTP comprises a detectable label.

46. The method according to claim 42, wherein said capture probe is a nucleic acid.

47. The method according to claim 42, wherein said capture probe is a protein, wherein said protein binds to said sequence contained within said ligation product.

48. The method according to claim 42, wherein said discrete sites are wells.

49. The method according to claim 42, wherein said microspheres are randomly distributed on said substrate.